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EXAMINER

PALABRICA, RICARDO J

ART UNIT	PAPER NUMBER
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3663

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/692,755	Applicant(s) TALEYARKHAN ET AL.	
	Examiner Rick Palabrica	Art Unit 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 34-47 is/are pending in the application.
- 4a) Of the above claim(s) 1-21 and 47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 34-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/8/07 and 10/27/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's 5/30/08 Amendment, which canceled claims 22-25, and 27-33, amended claims 34-45, and added new claims 46 (process) and 47 (apparatus), submitted additional references, and traversed the rejection of claims in the 9/27/05 Office action, is acknowledged.

2. As to new claims 46 and 47, note that in his 7/12/05 Response to the 6/21/05 Election/Restriction Requirement, applicant elected for examination Group II (Process), species G (D-T reaction) and species I (acoustical wave source).

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits.

Accordingly, claim 47 is withdrawn from consideration as being directed to a nonelected invention. See 37 CFR 1.142(b) and MPEP 821.03.

Response to Arguments

3. In the Remarks section of his 5/30/08 Amendment, applicant provided a response to the objection to the specification, lack of utility rejection, and lack of enablement rejection in sections 4, 5 and 6, respectively, of the 9/27/05 Office action.

Applicant asserts that:

a) Fig. 7c in Physical Review E, Vol. 69, 036109-1 to -11(2004),

“demonstrates experimentally the D-D fusion neutrons of 2.45 MeV in energy as required for thermonuclear fusion are emitted in a time-correlated manner with the emission of sonoluminescence (SL) light flashes clarifying and demonstrating that the fusion reactions are occurring under hot, compressed conditions for the method and apparatus of this present invention application.”

b) Physics of Fluids (Nigmatulin et al. 2005) provides confirmation that:

“the theoretical foundation when applied specifically to the method of the present invention confirms thermonuclear conditions.”

c) Xu et al. (Nuclear Engineering and Design journal paper, Vol. 235, 2005), Forringer et al. (Archives of Trans. American Nuclear Society, Vol. 95, 2006), and Le Tourney University, Texas, Press Release, 2006 , are further cited as proof of reproducibility and operability.

The examiner disagrees.

First, the applicant's elected invention is directed to a D-T reaction and not to the D-D reaction discussed in Physical Review E.

Second, neither Physical Review E nor Physics of Fluids has any probative value for showing enablement and utility of the claimed invention at the time of filing for its application. Note that these two references were published in 2004 and 2005, respectively, whereas the application was filed on 10/27/03. The same remark applies to the three references cited in c) above, which were published in 2005, 2006 and 2006, respectively.

Accordingly, the objection to the specification, lack of utility rejection, and lack of enablement rejection in the previous Office action is maintained.

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The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Specification

4. The specification is objected to under 35 U.S.C. 112, first paragraph, as failing to provide an adequate written description of the invention and as failing to adequately teach how to make and/or use the invention, i.e., failing to provide an enabling disclosure.

The reasons are the same as those stated in section 4 of 9/27/05 Office action, as further clarified in section 3 above, which reasons are herein incorporated.

5. Claims 34-46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The reasons are the same as those stated in section 6 of 9/27/05 Office action, as further clarified in section 3 above, which reasons are herein incorporated.

Claim 34 recites the limitation, "placing at least a portion of said liquid into a tension state, a maximum tension in said tension state being below the cavitation

threshold of said liquid.” There is neither an adequate description nor enabling disclosure as to how and in what manner one can determine: a) that a portion of the liquid is in the so-called tension state; b) the maximum tension in a portion of the liquid in a tension state; and c) that the maximum tension is below the cavitation threshold of the liquid.

Claim 34 further recites, “imploding said bubbles substantially filled with vapor.” There is neither an adequate description nor enabling disclosure as to how and in what manner one: a) can determine when a bubble has been substantially filled with vapor; b) identify which of the bubbles that are allegedly substantially filled with vapor; and c) how many of these bubbles to implode to induce a nuclear fusion reaction.

Claim 42 recites, “synchronizing neutron impact with a location in said liquid having a predetermined liquid tension level.” There is neither an adequate description nor enabling disclosure as to how and in what manner one: a) can determine the occurrence of an impact of the neutron with the pre-tensioned liquid; b) synchronizes the neutron impact with a location in said liquid; c) determines which specific location to direct the impact of the neutron.

6. Claims 34-46 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In amended claim 34, applicant has deleted the step, "degassing said liquid to reduce a dissolved gas content therein, wherein said dissolved gas is removed using an applied vacuum." Note the following passages in the specification that demonstrate criticality of the degassing step in the exercise of the claimed invention:

"To minimize the effect of gas cushioning during implosive collapse, the working liquid can be degassed, a priori. Alternatively or in combination, a sufficient vacuum state above the working liquid accompanied by induction of gaseous cavitation induced by nuclear particles such as neutrons or via use of lasers or acoustic horns can be used to reduce the dissolved gas content in the working liquid to limit unwanted gas cushioning." See page 17, 2nd paragraph.

Following degassing of the working liquid, the liquid is tensioned and nucleation of vapor cavities followed by implosion of the same can be initiated. Tensioning the liquid can be provided by a variety of methods, including an acoustical wave source, an electrostrictive (piezoelectric) source, a magnetostrictive source, a centrifugal source, a focused (pulsed) acoustic energy or a venturi based system. Preferably, when an acoustical wave source is used, the acoustical wave source includes an acoustical focusing device, such as a parabolic-type reflector or a resonant cavity to intensify the acoustic pressure. See page 17, last paragraph.

The new matter pertains to the deletion of this degassing step.

7. Claims 34-46 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The degassing the working liquid to remove the dissolved gas content, which is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

8. Claims 34-46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are vague, indefinite and incomplete, and their metes and bounds cannot be determined because the claims are inconsistent with the specification at least in regard to the step of degassing the working liquid to reduce a dissolved gas content.

Claim 44 recites the limitation "said fundamental particles" in lines 1 and 2. There is insufficient antecedent basis for this limitation in the claim.

The term "high accommodation coefficient liquid" in claim 46 is a relative term which renders the claim indefinite. The term "high" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 34-40, 42, 44 and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by either one of Margulis (RU 2096934) or Lipson et al., "Initiation of fusion reactions in media containing deuterium by cavitation," Soviet Physics: Technical Physics 37 (1992).

Margulis

As to claims 34, 35, 37-40, 44 and 45, Margulis discloses a method for generation of high-temperature plasma and generating thermonuclear reactions by providing a liquid enriched with a mixture of deuterium and tritium, creating tension microbubbles containing such mixture by ultrasonic vibrations and thereby generating thermonuclear reactions.

Applicant has not defined which portion of the working liquid is placed in a maximum tension below the cavitation threshold. Absent such definition, the examiner interprets the term broadly and reads it on any and all portions of the working liquid. Accordingly, one can always find a portion of the liquid in Margulis that has such maximum tension below the cavitation threshold.

As to the claimed "nucleating agents", the thermonuclear reactions in Margulis inherently produce at least neutrons and photons, and these are inherently directed to the tensioned liquid because said particles and said liquid are in the same contained volume of the apparatus

As to the bubbles being substantially filled with vapor, applicant has not defined the term substantially filled, and the examiner interprets this term broadly to read on any degree of filling that occupies most of the internal volume of a bubble. One can always find a plurality of bubbles in Margulis that is mostly filled with vapor because of the heat produced from the thermonuclear reaction

As to the growing of the bubbles and the temperature generated from the system, note page 6, last 2 lines in the English language translation of Margulis.

As to claim 36, Margulis teaches the use of heat exchangers for cooling (see page 11 of the English language translation).

As to claim 42, applicant's claim language, "neutron source" reads on the fusion reactions in Margulis that inherently produce neutrons.

Lipson et al.

As to claims 34, 35, 37-40, 44, and 45, Lipson et al., disclose a method for creating fusion reactions in media containing deuterium by cavitation. (As to the interpretation of the undefined terms in applicant's claim, the discussion above relating to Margulis applies also to Lipson et al.).

As to the nucleating agents, Lipson et al. discloses the generation of neutrons (see page 1191, col. 2, last paragraph)

As to tensioning of the liquid below the cavitation threshold, growth of the bubbles and their collapse, see page 1190, bottom of col. 1 and top of col. 2.

As to claim 36, Lipson et al. disclose a cooled vessel (see page 1190, col. 2, "Experimental Apparatus and Procedure").

As to claim 42, applicant's claim language, "neutron source" reads on the fusion reactions in Lipson et al. that inherently produce neutrons.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Margulis or Lipson et al.

The size of the bubble is a parameter that depends upon specific design constraints for the system, e.g., the desired energy density of the bubbles (see page 5 of the English language translation of Margulis). Thus, it would have been obvious to modify Margulis or Lipson et al. where an application requires the claimed size of the nucleated bubbles. Such modification would have been within the knowledge and capability of one of ordinary skill in the art at the time of the claimed invention.

11. Claim 43 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Margulis or Lipson et al. in view of Didenko et al. (Nature 418, 7/25/02).

Margulis or Lipson et al. disclose(s) the applicant's claims except for the organic liquid.

Didenko et al. teach that organic liquids are advantageous for processes involving cavitation because of their very low volatility (see page 4, last full paragraph).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method, as disclosed by Margulis or Lipson et al., by the teaching of Didenko et al., to use organic liquids (which have high accommodation coefficients) for the cavitation liquid, to gain the advantages thereof (i.e., low volatility), because such modification is no more than the use of a well known expedient within the art.

Duplicate Claims, Warning

12. Applicant is advised that should claim 34 be found allowable, claim 44 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. MPEP § 706.03(k) states:

“When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim.”

Conclusion

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 571-272-6880. The examiner can normally be reached on 6:00-4:30, Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

July 21, 2008

/Rick Palabrica/
Primary Examiner, Art Unit 3663